Estuarine habitat characterization and distribution: potential evidence for landscape-scale dike impacts

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The Nature Conservancy's Port Susan Bay preserve protects 1600 ha of estuarine habitat at the mouth of the Stillaguamish River. Like many estuaries in northern Puget Sound, much of the historic tidal marsh was diked and drained in the late 1800s. To begin understanding the current ecological structure and functioning of the Stillaguamish River estuary, we developed a stratified random sampling approach to characterize habitats across more than 2100 ha. Preliminary mapping results showed that the estuary is dominated by roughly 1430 ha of unvegetated mudflats. Vegetated mudflats, emergent marsh, and non-native eelgrass contributed 14%, 9%, and 8%, respectively, to the total intertidal area sampled. As expected, these habitats differed in plant density and composition, hydrology, porewater salinity, sediment composition, and recruitment of large woody debris. We also investigated spatial differences in these factors, to examine potential indirect effects of dikes. We found the greatest vegetation differences in the high elevation emergent marsh, where plots near the major river channel had greater diversity and greater densities of four brackish marsh species than plots whose hydrologic connection with the river was at least partially blocked by dikes. Similar density differences were also observed in low elevation emergent marsh and vegetated mudflats.